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SUB-CALCANEAN SPURS IN GONORRHŒA

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AMONGST the various types of connective tissue that are affected by the variety of metastatic gonorrhœa known as gonorrhœal rheumatism, lesions of bone, as distinct from lesions of joints, are but seldom encountered, and even in large clinics where many cases of gonorrhœa are dealt with such bony lesions are only occasionally seen.

The involvement of bone by gonorrhœal infection may be of two varieties, either a localised periostitis, originally described by Fournier,³⁰ examples of which have been reported in detail by Ozenne⁹ in the shaft of the tibia, and in the femur by Watts⁴ and Hirtz,²⁸ or an acute osteo-myelitis. The latter is commonly the result of a direct spread from a gonococcal infection of a neighbouring joint, but isolated infections of the medullary cavity of long bones, a very rare condition, have been described in the humerus by Ullmann⁵ and by Cupler,⁶ and in the tibia by Heyman.⁷

Of the lesions limited to the periosteum in gonorrhœa a local chronic periostitis is the common type which if persistent leads in time to the formation of new bone, and following each exacerbation of the inflammatory process additional layers of bone are deposited, the final result being a nodular mass of bone. This process in some regions, notably on the os calcis, forms a spiny projection known as a spur. Such periosteal infection in gonorrhœa is much more frequent on the os calcis than on other bones, but examples of the occurrence of gonococcal periostitis of local limitation and nodular in form on bones other than the os calcis have been noted by McDonagh³ on the trochanter of the femur, on the olecranon by Japiot and Kuentz,¹ and Gallois and

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Japiot,² on the tibia and fibula by Luys,²⁷ on the metatarsals and scaphoid by Marot,³¹ Baer,¹³ and Jaeger,¹⁵ also on the ribs by Claisse.⁴⁰

In the cases to be described and illustrated such areas of localised periostitis will be noted on the cuboid, scaphoid and astragalus.

The formation of bony spurs on the os calcis in connection with gonorrhœa has been noted frequently since the close clinical association was pointed out by Jacquet⁸ in 1892. These are generally single, bilateral, and are found in the great majority of cases growing from the medial tuberosity of the os calcis—the *sub-calcanean spurs*.

Similar osteophytic outgrowths may also occur, but less frequently, as the *retro-calcanean spurs* on the postero-superior surface of the os calcis in the vicinity of the bursa deep to the tendo Achillis; these growths generally exist alone, but may be concomitant with a sub-calcanean spur, as noted by Marot,³¹ Merritt,¹⁰ Davidson¹¹ and Painter.¹² An interesting condition has been recorded by Massart³² in which a continuous area of periostitis existed on the surface of the os calcis extending from the region of the tuberosities around the posterior surface of the heel up to the insertion of the tendo Achillis. In association with sub-calcanean spurs small areas of localised periostitis in other bones have been noted, as in the scaphoid and lumbar vertebræ by Baer,¹³ and in the metatarsals, by Jaeger,¹⁵ Baer,¹³ and Marot.³¹

Joint lesions of gonorrhœal origin are much more frequently observed in association with these spurs than any bony lesion, and may be met with in any of the articulations usually infected in gonorrhœa, the commonest being the ankle joint or tarsal joints of the limb concerned. A particularly interesting but rather uncommon example of this association is the co-existence of arthritis of the intervertebral joints, especially in the lumbar section of the spinal column, as observed by Norris³⁰ and Jaeger.¹⁵

Pathology.—The condition which has been known in connection with gonorrhœa under the name of "painful heel," "calcaneus-sporn," "pied blenorragique," etc., long before the presence of spurs was known, probably included a proportion of sub-calcanean spurs. The recognition of these spurs was soon followed by bacterio-

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logical support for the long-established clinical association with gonorrhœa. Baer¹³ in 1906 published cases in which gonococci were grown in cultures from an excised spur and were found in stained sections of spurs. This was repeated by Jaeger¹⁵ in 1908, and by Bertein³³ in 1913.

However, gonococci cannot be found locally in more than a few cases of spurs, nor can a history of gonorrhœa invariably be elicited or signs found in the genito-urinary system, yet most observers were formerly in agreement that the large majority of cases were due to a gonococcal infection. In recent years this belief has been assailed, and Meisenbach,¹⁶ who recorded twenty-two cases of sub-calcanean spurs, found only two which he considered to be gonococcal in origin. He gave the following causes :—

| | | | | |
|-----------------|---|---|---|---------------------------------|
| Traumatic | . | . | 9 | |
| Osteo-arthritis | . | . | 4 | |
| Syphilitic | . | . | 3 | |
| Gonococcal | . | . | 2 | |
| Infective | . | . | 3 | (<i>B. coli</i> in two cases.) |
| Tuberculous | . | . | 1 | |

Lewin¹⁴ is especially insistent that the prevailing teaching, that almost all sub-calcanean spurs are of gonococcal origin, is incorrect and classifies the causes into the following groups, but does not give the proportions :—

- (1) Focal infections . . . Teeth, tonsils and gonorrhœa.
- (2) Metabolic . . . Gastro-intestinal causes.
- (3) Traumatic . . . Chiefly due to improper shoes.
- (4) Static . . . Flat-foot.

Influenza has also been cited as a cause of calcanean spurs by Frankë.²⁵ Cochrane¹⁹ considered some of the bilateral examples to be of congenital origin.

There is little to be found in the literature of the subject on calcanean spurs occurring in women, but in the series of cases reported by Meisenbach¹⁶ and referred to above there were nine cases of sub-calcanean spurs in women, none of which were due to gonorrhœa; of these

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four were osteo-arthritic, four due to flat foot and two caused by a *B. coli* infection of the urinary tract.

French observers, however, appear to be unanimous in considering the cause to be gonococcal in most cases in the male.

It is clear that although all spurs are not invariably of a gonococcal origin, there is a most striking clinical syndrome of gonorrhœal urethritis, gonorrhœal arthritis and sub-calcanean spurs which is present in many of the cases amongst the young adult males, and although gonococci have been found in the spurs in only a few cases, there is no doubt that the great majority of cases presenting this syndrome are caused by a gonococcal infection.

The classical gonorrhœal spur may therefore be described as a sub-calcanean spur, frequently bilateral, which occurs apparently exclusively in males between the ages of eighteen to thirty-five, and is associated with the presence of gonorrhœal urethritis of long duration and gonorrhœal arthritis of one or more joints.

Description.—The spur usually encountered is a single tooth-like projection of bone arising from the anterior edge of the medial tuberosity on the inferior surface of the os calcis and pointing in a forward and slightly downward direction into the soft parts of the sole. Multiple spurs are very uncommon, but examples have been recorded by Jaeger,¹⁵ Labernadie,³⁴ and Reclus and Schwartz.³⁸

The above position of the spur is not constant, as it may also originate in the interval between the medial and lateral tuberosities, and according to Meisenbach¹⁶ this is a common situation. Baer¹³ states that the base of the spur is situated immediately in front of the attachment of the plantar fascia at the site of origin of the flexor brevis digitorum, and a spur was found by Barker¹⁷ to be situated anterior to the medial tuberosity.

When the spur is fully developed various types may be met with, a sharp spike with broad base (Fig. 8), a blunt conical projection (Fig. 7) or an irregular rounded mass (Figs. 1, 2, 5, 6).

Occasionally a pedunculated mass with expanded head and narrow stalk may be found which may be attached to the os calcis by fibrous tissue only or be completely detached possibly as the result of fracture of the spur

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from trauma. The size of these spurs varies considerably, as may be seen from the accompanying figures; the usual range of size is from that of a pea to that of an acorn. The relation of the spur to the plantar fascia is usually an intimate one, and this structure frequently participates in the inflammatory process; in other cases the extremity of the spur projects into the short flexor muscles (Baer,¹³ Robert-Jones²⁶), and rarely into the long plantar ligament (Barker¹⁷).

Between the spur and the underlying soft tissues an adventitious bursa occasionally develops, which when inflamed adds to the pain and increases the disability. This bursa is considered by Hertzler²⁹ to be very frequent and of normal occurrence, and Lenoir⁴¹ also has described a sub-calcanean bursa as being constantly present in this position in the normal foot; this was not confirmed by Labernadie,³⁴ who was unable to find a bursa in any one of twenty-eight normal subjects. A spur does not exist in relation to all inflamed bursæ in this region in cases of gonorrhœa, but spur formation may ensue after the discovery and excision of an inflamed bursa, as reported by Moure and Raillet.³⁵

Sections of spurs removed at operation show dense granulation tissue pervaded with well-developed new bone formation, and the condition is generally described as an ossifying periostitis (Jaeger,¹⁵ Baer,¹³ Merritt¹⁰).

Symptoms.—The outstanding feature in these cases is persistent and marked pain on pressure in the centre of the under-surface of the heel, the onset of which is insidious, the progress gradual, and finally the patient is obliged to walk upon the forepart of the foot, being quite unable to bear any weight on the heel.

The disability progresses in some cases to complete disablement, and Jaeger¹⁵ has reported a case who was so completely incapacitated that he was confined to bed for two years.

In severe cases the pain may radiate over the whole foot, spreading upwards into the leg, but in the average case the pain is strictly localised over the area of the bony lesion. The persistent pain on walking and continual disability may become intolerable, as is well illustrated in the history told by Lewin¹⁴ of a patient who, having suffered for a long period from sub-calcanean spurs, in despair pounded his heels with a hammer and;

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having decided that some relief resulted, continued this novel treatment daily for many months.

On examination of the foot there will be found in most cases an exquisite tenderness which is characteristic of the condition, limited to a small circumscribed area underlying the apex of the medial tuberosity of the os calcis, in which area on deep pressure the projecting apex of a large spur may occasionally be felt. More frequently there will be found some thickening of the soft tissues and skin under the heel, which in cases of long duration sometimes shows the formation of callosities or corns, a complication which is apt to obscure the diagnosis (Chauffard³⁹).

Tenderness at the sides and back of the heel may also be found, generally associated with slight swelling of the soft tissues in this region, and there may be some tenderness over the tuberosity of the scaphoid.

Deformity to any gross extent is rare, although flat-foot is frequent; a persistent varus position of the foot has been noted in one case by Labernadie.³⁴

The association with a gonococcal infection of joints has already been referred to, and Marot³¹ has observed cases in which the onset of symptoms of a sub-calcanean spur has coincided with the onset of joint complications elsewhere in the body; also that exacerbations of the symptoms of a spur have been synchronous with exacerbations of gonorrhœal rheumatism of general distribution.

It has been pointed out by several observers that the symptoms are not always proportional to the size, projection or sharpness of the spur, and extensive spurs have been found which have caused no symptoms, a contrast which is particularly striking in some of the bilateral cases, in which the spur on one heel only is giving rise to complaint.

Typical symptoms may precede the radiological recognition of a spur by varying intervals of time, since the earliest stage in the formation of a spur, the stage of periosteal irritation, cannot be detected immediately by radiological methods, but sooner or later a fully developed spur can almost always be found.

This clinical sequence has been noted by Emery³⁶ and Jacquet,³⁷ and will be found in the history given below of Case No. 1.

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During the last few years four cases of sub-calcanean spurs in males suffering from gonorrhœa have been under observation by me during a period of two years or more, in two of which the spurs were bilateral.

As will be noted in the case histories given below, a long history of gonorrhœa is related, a history interspaced with numerous attacks or recurrences of gonorrhœa complicated by prostatitis or vesiculitis and the infection of various large or small articulations, the

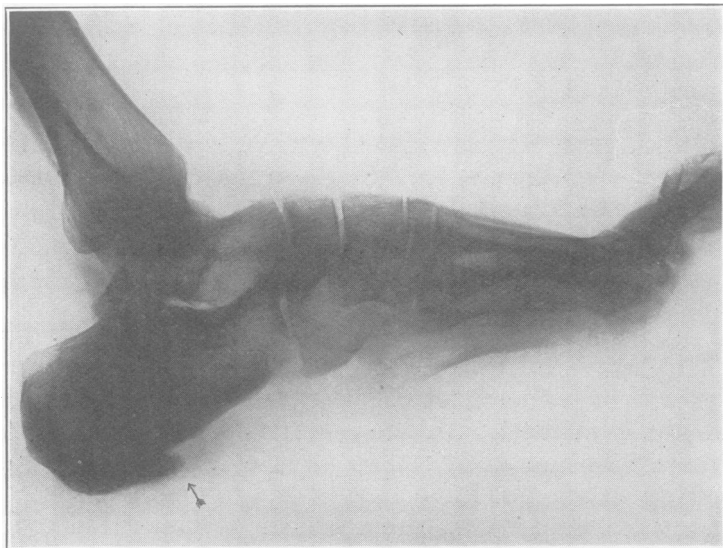


FIG. 1.—Case No. 1. Sub-calcanean gonorrhœal spur, left os calcis. August, 1925.

symptoms of which have usually preceded the symptoms due to the spur.

CASE No. 1 (A. 174). Male, æt. 29. First attended in June, 1924, with a painful swelling of the left shoulder joint, giving a history of an attack of gonorrhœa in 1914, since when he has noticed no discharge. On examination no urethral discharge was seen, but purulent threads were found in the urine; the prostate gland, although not enlarged, was tender, and its expressed secretion contained numerous pus cells and gonococci. Treatment was instituted with prostatic massage, irrigations and gonococcal vaccines, and followed by the recovery of the shoulder joint.

In January, 1925, he complained of pain in both feet,

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but no bony or joint lesion was reported after X-ray examination; the prostatic secretion still contained

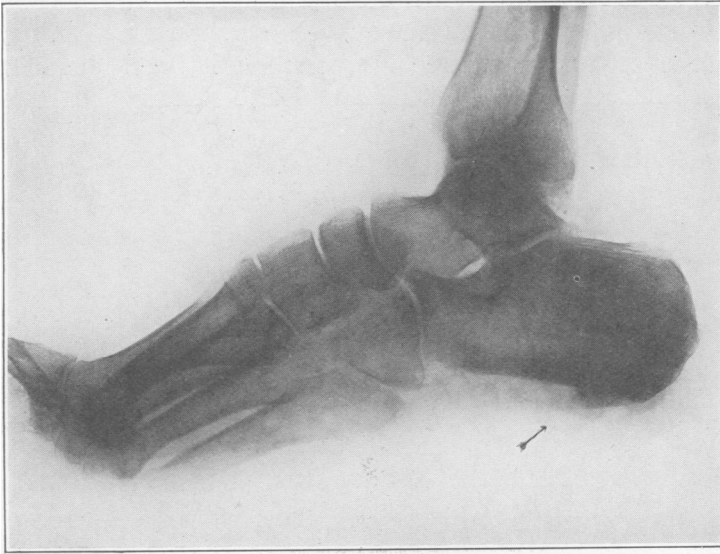


FIG. 2.—Case No. 1. Sub-calcanean gonorrhœal spur of nodular variety, right os calcis. August, 1925.

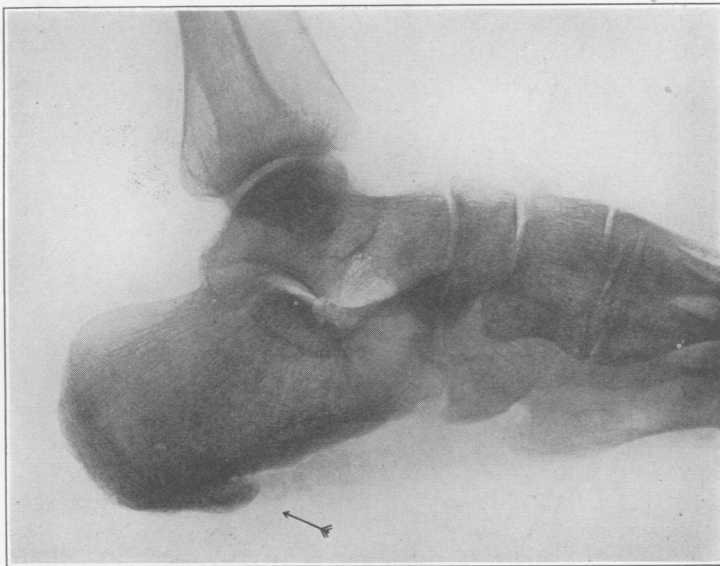


FIG. 3.—Case No. 1. The same spur as in Fig. 2 fifteen months later, showing increase in the growth of the spur.

gonococci. He ceased attending until July, 1925, when he returned with pain in both heels; radiological examina-

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tion showed bilateral sub-calcanean spurs of considerable size (Figs. 1 and 2), and sponge heel pads were fitted, which he wore for a month without any definite relief.

He re-attended in November, 1926, complaining of tenderness in both heels which had been persistent

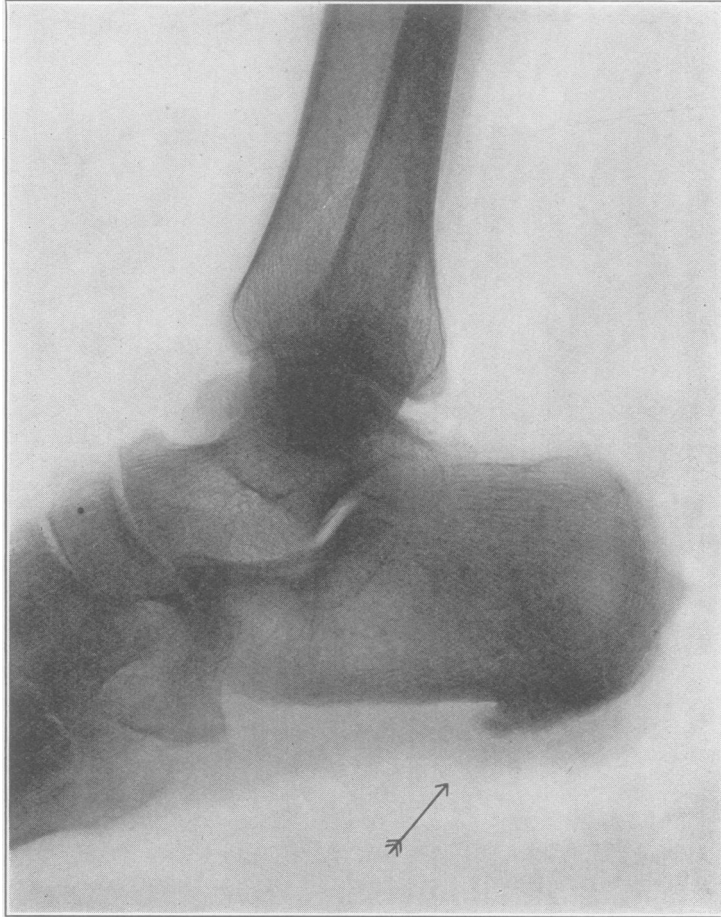


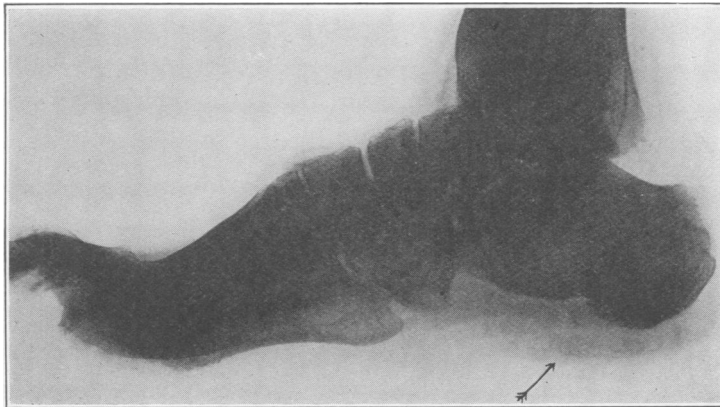
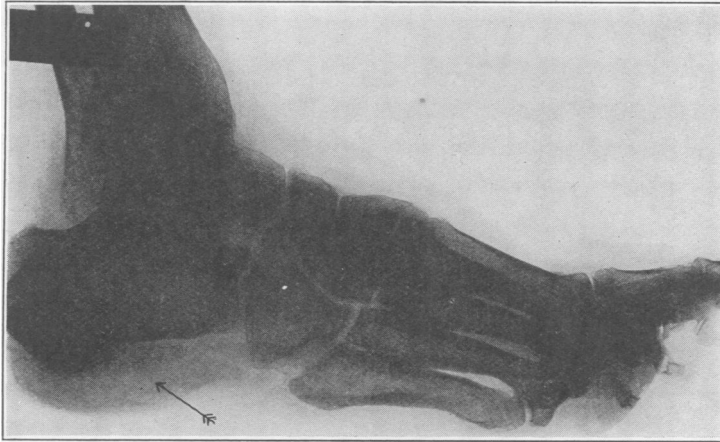
FIG. 4.—Case No. 1. The same spur as in Fig. 2 fifteen months later, showing recent and old bony deposit.

since July, 1925; on palpation the under-surface of both heels was very tender, and under the left heel a blunt protuberance could be felt superficially in the region of the medial tuberosity.

Radiological examination showed the spurs (Figs. 3 and 4) to have increased considerably in size during the fifteen months elapsing since Figs. 1 and 2 were recorded,

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and a close scrutiny of the spurs in Figs. 3 and 4 will reveal a central base of "old" bone capped by an even deposit of recent new bone formation. An irregular layer, probably also of recent bone formation, will also be



FIGS. 5 AND 6.—Case No. 2. Bilateral sub-calcaneal gonorrhœal spurs of blunt nodular variety, with some bony deposit on the tuberosity of the cuboid in Fig. 6.

noted on the head of the astragalus and on the upper surface of the scaphoid in Fig. 3.

Excision of the spurs was recommended by Mr. W. H. Trethowan and carried out by Mr. C. Lambrinudi, who removed from both feet a large sub-calcaneal spur an inch in length arising chiefly from the medial tuberosity, slightly from the lateral tuberosity and partly from the area of bone in between.

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Each spur consisted of a dense bony cuneiform base surmounted by a mass of dense fibrous tissue, projecting into the fibres of the flexor brevis digitorum, and separated from the plantar fascia by a thick-walled bursa of small capacity, which was removed with the spur.

Cultures taken from both bursæ and both spurs proved sterile.

Sections of both bursæ and both spurs were prepared and examined for gonococci with negative results.

CASE No. 2 (A. 35). Male, æt. 32. First suffered from gonorrhœa in 1913, since when he has had several attacks, some of them associated with pain and swelling of the knees, shoulders and feet. He came under observation in 1924, when he was found to be suffering from chronic vesiculitis and prostatitis and a peri-arthritis of the metacarpo-phalangeal joint of the right thumb. The prostatic secretion was purulent, but no gonococci were found; the gonococcal complement fixation test was positive. Treatment by vaccines, prostatic and vesicular massage and irrigation was carried out for a month; he then disappeared for six months, and on his return in March, 1925, complained of pains in the heels, which were swollen and tender. X-ray examination revealed bilateral sub-calcanean spurs of the blunt nodular variety (Figs. 5 and 6), and as shown in Fig. 6 some localised new bone formation on the tuberosity of the cuboid. Chronic prostatitis and vesiculitis were still present. Excision of the spurs was followed by relief of the symptoms and the case lost sight of.

This patient also suffered from syphilis acquired in 1920, for which he received extensive treatment; the Wassermann reaction was still positive in 1925.

CASE 3 (A. 946). Male, æt. 27. In 1922 he first suffered from gonorrhœa complicated by acute epididymitis, for which he underwent treatment, but ceased attending as soon as the urethral discharge ceased, and before any tests for cure could be carried out. He came under observation again in June, 1925, with a recurrence of discharge and was found to have a chronic prostatitis, the gland being swollen and tender and its secretion containing numerous gonococci.

In September, 1925, he was laid up in bed with painful swelling of left knee and left foot, which gradually cleared up, leaving him with a painful left heel. On radio-

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logical examination a small sub-calcaneal spur of conical shape was noted (Fig. 7).

The heel symptoms were relieved by fixation of the

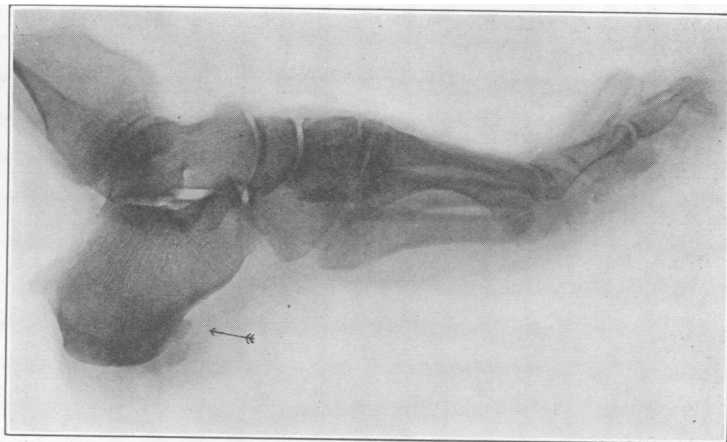


FIG. 7.—Case No. 3. Sub-calcaneal gonorrhœal spur of conical shape on left os calcis. January, 1926.

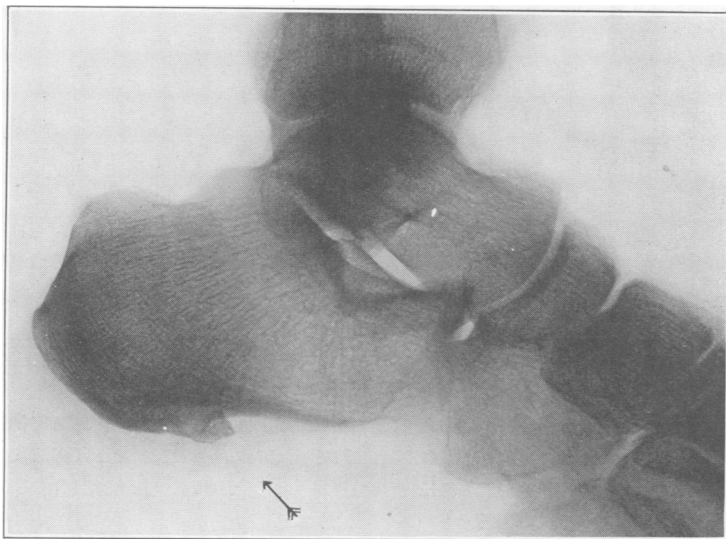


FIG. 8.—Case No. 3. The same spur as in Fig. 7 eleven months later, now a well-defined spike with no recent periostitis and causing no symptoms.

foot and leg in a plaster splint for six weeks, since when he has had no pain.

He reappeared in October, 1926, with active gonococcal urethritis again ; no heel pains had been experienced since the application of the plaster splint nine months pre-

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viously; on radiological examination the sub-calcanean spur was still present and of approximately the same size as before, but its outline was now that of the spiky variety.

CASE No. 4 (A. 1253). Male, æt. 30. First suffered from gonorrhœa in 1919, and first came under my observation in 1923 with a painful swelling of the right ankle joint and elbow joint, associated with chronic

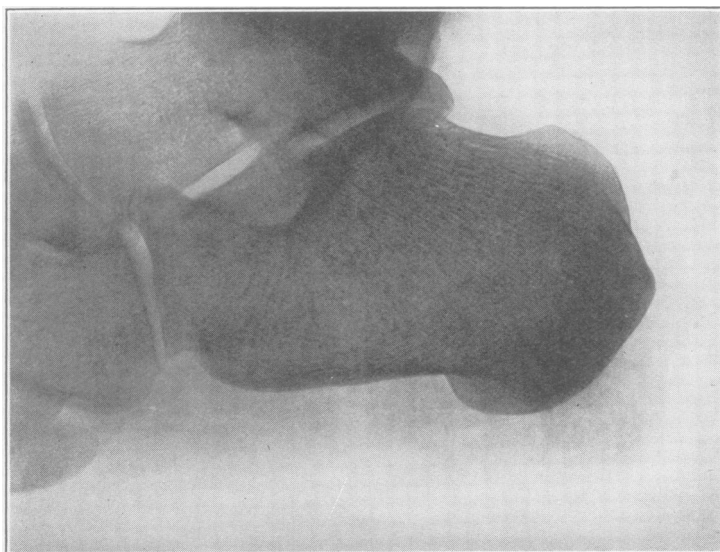


FIG. 9.—Case No. 4. Normal right os calcis on same date as Fig. 10.

prostatitis. He was treated for a few weeks and then ceased attending.

In 1924 he was under treatment for chronic prostatitis for a few months and again disappeared.

A recurrence of discharge, containing many gonococci, brought him back in 1925, and he complained of pains in the neck, right ankle and left heel. Radiological examination (Fig. 10) of the left heel showed slight periostitis of the medial tuberosity, but no definite spur, probably an early stage in spur formation. He improved with urethral treatment and vaccines and was lost sight of again until February, 1927. At this time, after an interval of sixteen months, he stated that his left heel caused slight symptoms only.

There was no marked tenderness under the heel,

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but on deep pressure some enlargement of the medial tuberosity could be appreciated.

There was also marked swelling and stiffness of the right thumb, of which the metacarpo-phalangeal joint showed rheumatoid changes on X-ray examination. At this period he attended on one occasion; there was no urethral discharge, but the urine contained threads. The prostatic secretion appeared normal and cultures of this and of the urine were sterile.

A radiograph of the left heel (Fig. 11) shows a further

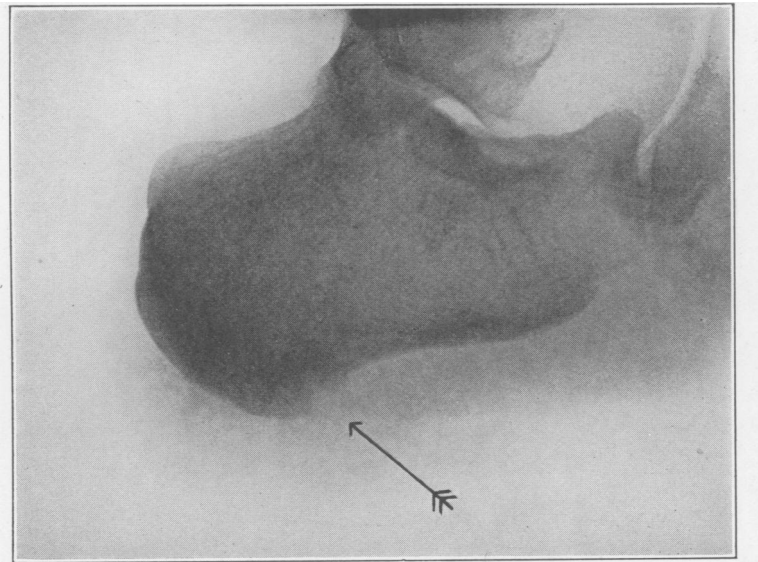


FIG. 10.—Case No. 4. Early stage of spur formation in left os calcis, showing apical periostitis of the medial tuberosity.

extension of the condition in Fig. 10. The new bone formation has now obliterated the slight erosion present in the apex of the tuberosity in Fig. 10, and further deposits of new bone have been added, the whole now constituting a small irregular unconsolidated spur of recent formation and of the rounded type in which the inflammatory process appears still active.

Treatment.—In the literature on this subject the location, extent and severity of the urethral infection have been extremely briefly referred to; the genito-urinary organs do not appear to have been subjected to any detailed examination except in a few isolated instances. Meritt¹⁰ has reported one case suffering from chronic

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prostatitis and vesiculitis in which gonococci were found in the secretion from these glands, and in one of Jaeger's cases a sub-mucous infiltration of almost the whole of the anterior urethra was found by Bierhoff.¹⁸

In all the cases reported here a chronic gonococcal inflammation of the prostate gland or seminal vesicle was present and had been present for some considerable time prior to the discovery of the spurs. In these four cases the average duration of the gonorrhœal history was

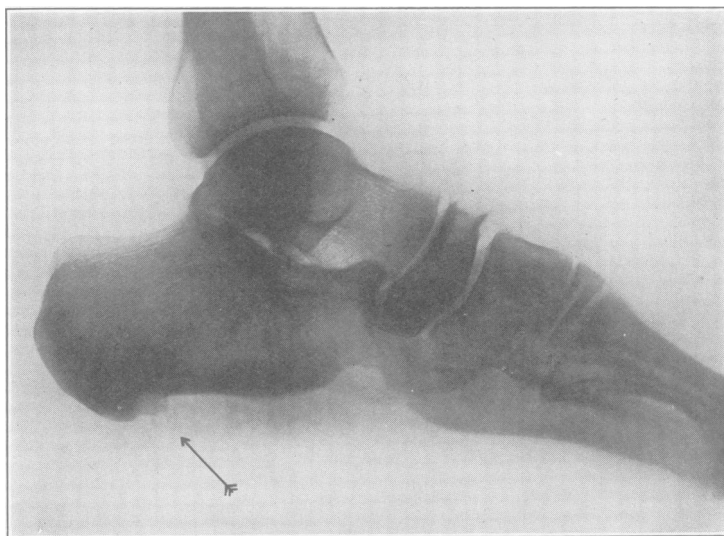


FIG. 11.—Case No. 4. The same as in Fig. 10 sixteen months later, showing progression of bony formation into a rounded unconsolidated spur.

nine years—the shortest being four and the longest twelve years.

This long history has previously been noted by others, but a short history of three to nine months has been reported by Baer¹³ and Winthrop.²¹

In the published accounts of the treatment of this condition there has hitherto been scant reference to the importance or necessity of adequate treatment for the urethral condition, which is surprising, in view of the complaints of the frequency of recurrence of these spurs after excision (Colvin,²³ Ryerson,²⁴ Meritt¹⁰), and by the lack of permanent relief of the symptoms in some cases following removal of the spurs.

There is evidently a quiescent and an active stage in the

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symptoms which may depend upon the activity of the genito-urinary lesion and the varying rate of absorption

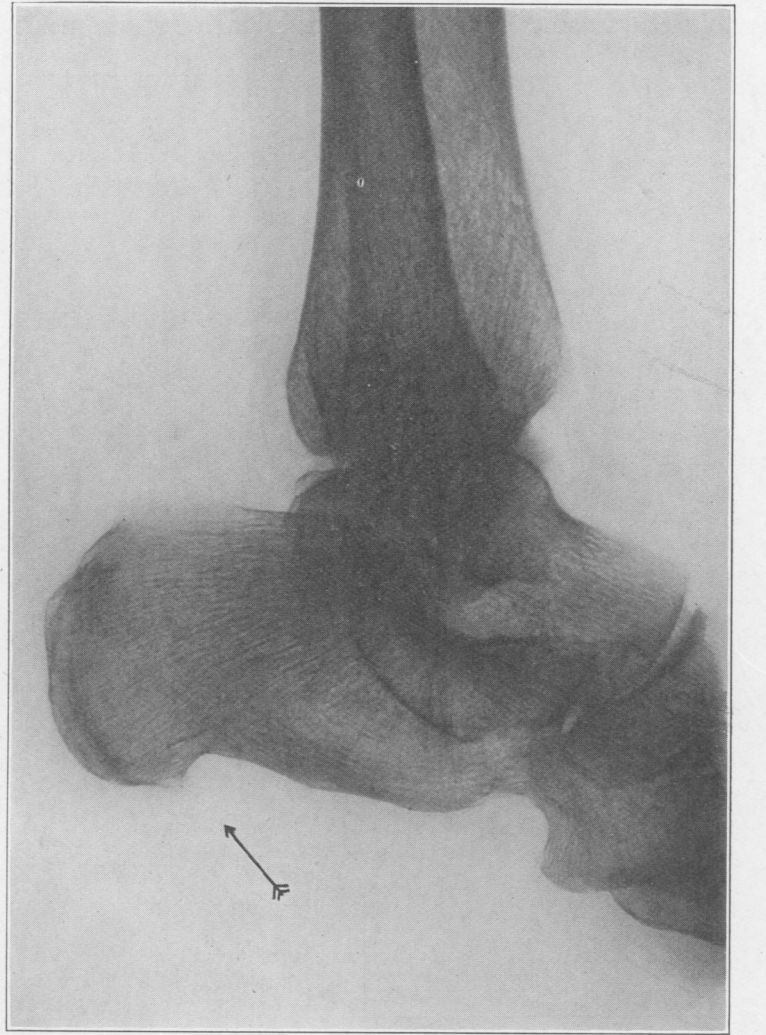


FIG. 12.—Bilateral sub-calcaneal spurs causing no symptoms in a male æt. 65; one of the blunt variety and one of the spiky type. No signs or history of gonorrhœa.

of gonococci or their toxins from this focus rather than upon any particular character of the spur.

As stated before, spurs of considerable size may exist without giving rise to any symptoms, as in Case 3, and symptoms may be marked for some time before a spur can be demonstrated, as in Case 1.

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However, it must be noted that the results of urethral treatment alone on the symptoms and progress of the spurs are frequently disappointing, as may be expected, for, as Thompson ²² has pointed out, both lesions must be

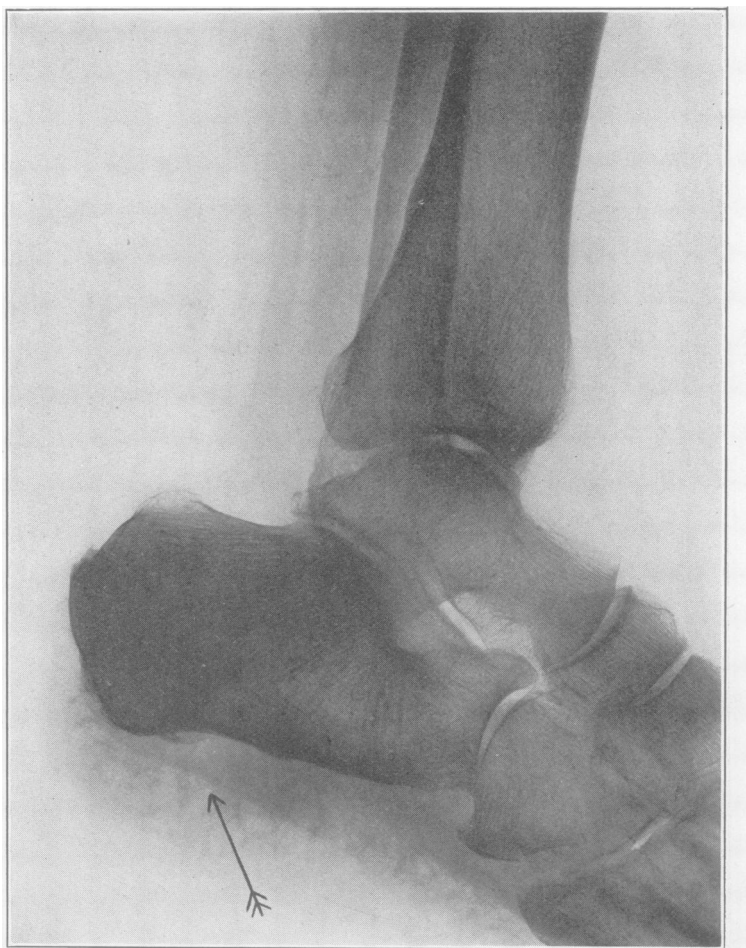


FIG. 13.—Bilateral sub-calcanean spurs carrying no symptoms in a male æt. 65; one of the blunt variety and one of the spiky type. No signs or history of gonorrhœa.

treated, and it is clear that the ideal treatment is an active co-operation between the urologist and the ortho-pædic surgeon, in which excision of the spur must be followed by adequate urological treatment to prevent development of a spur on the other os calcis if the condition is so far unilateral, and to prevent recurrence of the

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original spur after excision. Such treatment should be instituted at once and not delayed until after operative measures have been carried out.

The treatment is likely to be protracted and tedious, since these cases of chronic prostatitis and seminal vesiculitis are the most difficult and unresponsive of all urethral complications; the whole armamentarium of treatment by irrigations, dilatation, prostatic and vesicular massage, vaccines, etc., may be necessary to eradicate the focus, and may be required for some time before any improvement will be achieved.

The general treatment by orthopædic surgeons is to attempt to alleviate the symptoms in the early cases by local appliances, heel pads, etc., and to reserve excision for the late stages, any inflamed bursæ being removed with the spur.

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